

### **EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Jose Gutman on 9/8/2009.

The application has been amended as follows:

**Claim 1:** Canceled

**Claim 2** rewrite as: A method for estimating the phase in a digital communication system ~~according to claim 1 characterized by:~~ comprising the steps of:

receiving and storing a block of observations  $Y_k$ ; and

executing at least more than one phase locked loop (PLL) on a predetermined sequence of observations from said block;

executing a first PLL on said observations according to their chronological order of occurrence in order to generate a first intermediate value;

executing a second PLL on said observations according to their inverse chronological order of occurrence in order to generate a second intermediate value; and

combining said first and second intermediate values to generate a phase estimate.

**Claim 5** rewrite as: A method for estimating the phase in a digital communication system, comprising the steps of:

receiving and storing a block of observations  $Y_k$  of an output signal from a complex demodulator, with  $k$  varying from 0 to  $n$ ;

initializing ~~said first PLL~~ a first phase locked loop (PLL) from received observations  $Y_k$ ;

executing said first PLL according to the following formula:  $\varphi_k = \varphi_{k-1} - \gamma F(Y_k, \varphi_{k-1})$  with  $k = 1$  to  $n$ , where  $F$  is a function adapted to the type of modulation considered, where  $\varphi$  is a phase of an observation of the output signal from the complex demodulator, and where  $\gamma$  is realized by means of a second-order digital filter according to the formula  $\gamma = \gamma_1 + \gamma_2 / (1 + z^{-1})$ ;

initializing ~~said second PLL~~ a second PLL from observations  $Y_k$ , with  $k$  varying from  $n$  to 0;

executing said second PLL according to the following formula:

$$\varphi'_k = \varphi'_{k+1} - \gamma F(Y_k, \varphi'_{k+1}) \text{ with } k = n-1 \text{ to } 0; \text{ and}$$

combining the results produced by said first and second loops to generate a phase estimate.

## **REASONS FOR ALLOWANCE**

The following is an examiner's statement of reasons for allowance: claims 2 – 7, 9 and 10 are allowable over prior art of record. The prior art of record failed to teach a A method for estimating the phase in a digital communication system comprising the steps of: receiving and storing a block of observations  $Y_k$ ; and executing at least more than one phase locked loop (PLL) on a predetermined sequence of observations from said block; executing a first PLL on said observations according to their chronological order of occurrence in order to generate a first intermediate value; executing a second PLL on said observations according to their inverse chronological order of occurrence in order to generate a second intermediate value; and combining said first and second intermediate values to generate a phase estimate as claimed in independent claim 2 and similarly claimed in independent claims 3, 5, and 9. Thus claims 2 – 7, 9 and 10 are novel and non obvious over prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAISON JOSEPH whose telephone number is (571)272-6041. The examiner can normally be reached on M-F 9:30 - 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. J./  
Examiner, Art Unit 2611

/Chieh M Fan/  
Supervisory Patent Examiner, Art Unit 2611